CHAPTER 4: APPLICATIONS

Introduction

Three case studies are given as examples of the application of GISST. In addition, a peer review log/history of GISST activities and a map of the locations where GISST has been used appear in Appendix D.

Swine Concentrated Animal Feeding Operation (CAFO) New Source Determination

Location: Kingfisher County, OK

Scale: Watershed

Region 6 does NEPA review for New Source Determinations for NPDES permits in states where these Federal programs have not been authorized/delegated. Oklahoma does not have the NPDES permit authority for CAFOs. At the time in 1997, many states had been embroiled in controversies related to large CAFOs. Supporters of CAFOS argued that their facilities were simply another agricultural activity, protected in many states by right-to-farm laws, that supported local economies. Opponents of CAFOs argued that the facilities were under-regulated industrial operations that resulted in environmental and public health risks. As such, the public was often divided and EPA was looked upon as an objective third-party to fairly evaluate these controversial issues.

This case study shows how GISST assists in the complete NEPA process; from identification of baseline conditions and potential impacts; avoidance and mitigation of impacts; monitoring of mitigation commitments; and enforcement of Clean Water Act NPDES violations.

The environmental issue was that very large (4 million animals/year) swine CAFOs becoming established in a 1-2 county (watershed) area in Oklahoma. What was the ecological/environmental protection relationship? Possible leaching from lagoon and/or land application area causing nitrate contamination of groundwater which also serves as drinking water for some residents; odor from facility (lagoons and land application of swine waste); health concerns due to dead animal disposal.

Using GIS coverages and information in the applicant Environmental Information Document (EID), GISST showed that several criteria scored high (5, on a 1-5 scale); the amount of nitrate-nitrite

exceedances (STORET), probability of the water table within 6 feet of the surface and exacerbated by the number of CAFOs in proximity (see Chapter 3) to each other. For example, Figure 1 shows the surface water quantity criterion for Oklahoma. The facilities did well on the use of control technologies (lagoon liner, innovative sprayer technology). Figures 2 to 4 show D_V, D_I, and final CRIA/GISST scores (CRIA was the acronym of the pilot project), respectively, for five subwatersheds in Oklahoma where CAFO facilities are located. D_V (Figure5) and D_I (Figure 6) can be calculated for each facility as well, although this does not show the cumulative effects of all projects on the subwatershed (Figures 2 to 3).

The Regional Administrator determined that the CAFO would not have their NPDES permit approved and a FNSI for the EA until a monitoring protocol and schedule could be agreed upon, given that the GISST had identified groundwater contamination as a potential significant impact.

What stakeholders were involved? EPA, local citizens, CAFOs, agricultural consultants, ACCORD environmental group, Pork Producers What were the follow up steps or lessons learned? Monitoring (well) reports were submitted by the facility quarterly. At least one of these reports showed nitrate exceedances and possible groundwater contamination. This information was given to inspectors and enforcement officers and resulted in enforcement action..

Figure 1.

Figure 2.

Figure 3.

Figure 4.

Figure 5.

Figure 6.

IH-69 NAFTA International Corridor

Introduction

Interstate 69, or the NAFTA highway, is a congressionally approved transportation project to facilitate trade among the United State, Canada, and Mexico (Figure 7). The Congressionally-determined corridor stretched 1600 miles from Windsor, Canada to the US-Mexico border near Brownsville, Texas. Approximately, 1000 of these miles occur in Texas (Figure 8). The IH69 corridor is broken into segments of independent utility (SIU) for further study. Construction in each SIU can proceed independently of the others. When IH69 was first approved, several states already had Environmental Impact Statements (EIS) in progress for previous transportation needs and were subsequently incorporated as portions of IH69. Texas has not initiated scoping of the project in 2001. After IH69 scoping and study began, Texas introduced its Trans Texas Corridor (TTC) Project. TTC is a long range (50 years) concept aimed at planning for future transportation needs in Texas. It incorporates separate lanes for cars, trucks, high speed rail, freight rail, and utilities, all of which would be co-located within the same general corridor. IH69 was incorporated into these TTC activities, but each will have it's own EIS process.

Due to the broad scope and complexity of the project, the Federal Highway Administration (FHWA) invited other Federal and State agencies to provide input early in the process. This and Executive Order 13274, Environmental Stewardship and Transportation Infrastructure Project Reviews, also referred to as the Executive Order on Environmental Streamlining, brought the agencies together to discuss relevant issues. It became apparent that the other agencies would not have the resources to address multiple requests for information from

Figure 7.

Figure 8.

each of 14+ SIU contractors, nor would they be able to provide this information in order for FHWA to meet its deadlines. Each agency provided executive and technical staff who developed a process manual in which there would be various concurrence points throughout the IH69 process. FHWA also determined that a tiered NEPA approach, where Tier I assessed broad, corridor-wide alternatives and potential impacts, and Tier II would be NEPA documents specific to each SIU. Tier I does not authorize construction, but provides a method for the transportation agencies to identify corridors for future preservation. For example, the SIU that encompasses Harris County and Houston, Texas is fairly broad, but the likelihood of obtaining a one to four mile transportation corridor when it is needed in 20-50 years, would be very slim without a Tier I EIS. Within this streamlining pilot, EPA suggested the use of GIS data as a way to make the assessment process more manageable, and specifically the GIS Screening Tool (GISST) as a way of helping to assess single and cumulative potential impacts for the length of the corridor in Texas. Also, a coordinated effort to determine data needs and provide these data to FHWA would lessen the burden of each agency to respond to individual contractor requests and the data would be consistent for the length of the corridor.

The participating agency technical contacts met to discuss what data needs existed and whether they could determine a provider. Table 2 shows this "brainstorming" list of data needs. Tis list was truncated based on several factors, including the access or availability of data in electronic format, consistency across the entire corridor, resolution, and applicability to the. EPA presented the GISST to the groupand highlighted its usefulness in bringing many different data sets together using a scoring structure in order to visualize where potential impacts might exist and narrow the Congressionally-mandated corridor into a size more manageable for further field

Table 2. Types of Data and GIS coverages considered and their sources. Data in this table were not necessarily incorporated in GISST, but were considered initially. Acc refers to data access, and Cov refers to the extent of the coverage for the IH69 project.

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
Air Quality Resources	TCEQ & EPA R6	Nonattainment	Ozone Nonattainment & Near Nonattainment Areas	County Level, 1:100,000	2002	A	E
Agricultural Resources	USGS	National Land Cover Data (NLCD)	Agricultural Land Classification	30 meter resolution	1992	A	E
Aquatic Resources							
Hydrologic Data	U.S. EPA/USGS	National Hydrography Dataset (NHD)	U.S. Hydrographic Dataset	1:100,000	2000	A	E
Hydrologic Data	TWDB	Reservoirs to be included in the 1996 Water Plan	Generally reservoirs w/ authorized capacity of 5000+ acre-feet and authorized diversion of water for consumptive municipal or industrial use.		1997	A	E

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
	GLO	Coastal Management Zone Boundary	Inland extent of areas subject to regulation under the TX Coastal Management Program.			A	C
	Bureau of Transportation Statistics	National Waterway Network	Shipping waterways in and around the U.S.	1:100,000	2001	A	E
	U.S. Bureau of the Census	TIGER	Hydrologic Data	1:100,000	2000	A	E
Water Quality	TCEQ	Designated Stream Segments of Concern	Impaired waters from 1999 303(d) list.	1:63,360 - 1:250,000	1999	A	E
	EPA	TMDL	River segments, lakes, estuaries designated under CWA 303d as not meeting their designated use	1:100,000	1998	A	E
Wetlands	USGS	National Land Cover Data (NLCD)	Wetlands Land Classification	30 meter resolution	1992	A	E
Soils	NRCS	State Soil Geographic Database (STATSGO)	State Soils Layer	1:250,000	1994	A	E

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
Terrestrial Resources							
Soils	NRCS	Soil Survey Geographic Database (SSURGO)	County Soils Layer	1:24,000	Varied	A	M
Vegetation	Texas Tech Univ.	GAP	Vegetation and Species Habitat	30 meter	1998	A	E
Vegetation	TPWD	Vegetative Types of TX	TX Vegetation/Habitat	1:250,000	1982	A	E
Managed Lands	Varied	Managed Lands	Parks, Forest, Wildlife Refuges	Varied	Varied	A	E
Land Use/Land Cover	USGS	National Land Cover Data (NLCD)	Wildlife Habitat	30 meter	1992	A	E
Threatened & Endangered Species, Sensitive Habitats	TPWD	Biological & Conservation Data (BCD)	Quad/County Level Species Lists	7.5' Quadrangle & County	1994	A	E
	USFWS	Potential T&E Habitat in SE Texas	Potential Habitat in SE Texas	County Level	2001	L	X
	USFWS	Potential T&E Habitat in South Texas	Potential Habitat in South Texas	County Level	2002	L	X
	EPA	Potential Habitat Index	Model of Highly Sensitive Habitat	30 Meter	1992, 2002	A	E

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
	GLO	Priority Protection Habitat Areas (Upper & Lower Coast)	Areas along coast of Sensitive Coastal Habitats or Species	1:24,000	1995, 1998	A	C
	GLO	Bird Rookeries	Bird Rookeries along coast	1:24,000		A	C
	TPWD	Ecological Stream Segments of Concern	Ecological Significant River/Stream Segments	1:100,000	1995	L	E
Hazardous Waste & Brownfields	U.S. EPA	Envirofacts	EPA Permitted Facilities	Point Data - Varied Accuracy	Varied	A	E
	U.S. EPA	Toxic Release Inventory	Toxic Release Sites	Point Data - Varied Accuracy	2000	A	E
	U.S. EPA	Superfund Sites	Federal & State Superfund Sites	Point Data - Varied Accuracy	2002	A	E
	TCEQ	Hazardous Waste Sites	Federal & State Hazardous Waste Sites	Point Data - Varied Accuracy	2002	A	E
	TCEQ	Radioactive Waste Sites	Radioactive Waste Sites	1:24,000	2000	A	E
	TCEQ	Landfills	Municipal Solid Waste Landfills	Point Data - Varied Accuracy	1996	A	E
	TXDOT	TXDOT Maintenance Facilities	TXDOT Maintenance Facilities	1:2,000,000??	2000	A	E

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
Historic, Archeological & Cultural Resources							
Managed Lands (4(f) potential)	Varied	Managed Lands	National Parks, Forest, and Refuges; State Parks and Wildlife Areas	Varied	Varied	A	E
Archeological	THC/TX DOT	Archeological Site Distribution in the I-69 Corridor	Density Map Derived From Known Distribution of Sites	1:24,000	Varied	R	E
Archeological	THC	THC Atlas	Archeological Data	1:24,000	Varied	R	E
Cultural	TNRIS & TIGER	Indian Reservation Boundaries	Indian Reservation Boundaries	1:24,000	2000 ?		
Cultural	USGS	GNIS (Geographic Names Information System)	Physical & Geographical feature names	1:24,000	1981	A	E
Cultural	THC	Historic Markers	Historic Roadway Signs	Point Data-Varied Accuracy	2002	A	E
Cultural	THC	Historic National Register Properties	Historic National Register Properties	Point Data-Varied Accuracy	2002	A	E
Cultural	TXDOT	Historic Off-System Bridges	Historic Off-System Bridges	1:24,000	2001	A	E
Geology	BEG	Geologic Data	BEG Geology of South Texas	1:250,000		A	M

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
Topography	USGS	National Elevation Database (NED)	Elevation Data	30 meter resolution	Varied	A	E
Groundwater/ Aquifers	TNRIS/ TWDB	Major/Minor Aquifers	Major & Minor Aquifers of TX	1:250,000		A	E
	U.S. EPA Reg 6	Sole Source Aquifers	TX Sole Source Aquifers	1:100,000	1996		
Watersheds	USGS	8-digit Hydrologic Units	8-digit Hydrologic Units of the US	1:250,000	1995	A	E
Floodplains	FEMA	Q3 Flood Data	100yr/500yr Flood Plains	1:24,000	Varied	A	M
Social/ Economic/EJ	U.S. Bureau of the Census	PL94-171	Population & Minority Data	Block Level	1990/2000	A	E
	U.S. Bureau of the Census	SF3A	Population, Housing, Income Data (2000 should be available summer 2002)	Block Group Level	1990	A	E
Miscellaneous	USGS/TOPP	DOQQ	Digital Orthophoto Quarter-Quad	1 meter	Varied	A	E

Environmental Feature	Source	Database	Description	Scale & Accuracy	Date	Acc	Cov
	USGS	Digital Raster Graphic	7.5' Topographic Maps	1:24,000	Varied	A	E
	U.S. Bureau of the Census	TIGER	Urbanized Areas	1:100,000	2000	A	E
	TXDOT	County Boundaries	County Boundaries	1:24,000	2000	A	E
	Texas Water Development Board	Colonias	Locations of Colonias	Point Data - Varied Accuracy	1996	A	E
	TXDOT	TXDOT District Boundaries	District Boundaries	1:24,000	1994	A	E
		Aerial Photos	B&W Aerial Photos		2001	P	
	NASA	Landsat	Satellite Imagery	30 meter resolution	1996	A	E
	TIGER	TIGER	State & Federal Congressional Districts	1:100,000	2000	A	E
	U.S. Bureau of the Census	TIGER	Pipelines/Utilities	1:100,000	2000	A	E
	U.S. Bureau of the Census	TIGER	Railroads	1:100,000	2000	A	E
	EPA Region 6	Schools	Schools - Address Matched using TEA listing	100m	2002	A	M

A=widely available, C=Coastal area only, E=Coverage for the entire IH69 Corridor, L=Limited access, M=Coverage for a majority of the IH69 Corridor, P=Paper or image only, R=Restricted acess, X=Limited coverage for the IH69 corridor

investigation. In addition, EPA stressed the flexibility of GISST and that further criteria could be developed. This initially led to the development of four new criteria based upon data needs, Table 2, and a checklist of issues that FHWA must address in its EIS (FHWA Environmental Guidebook, www.fhwa.dot.gov/environment/guidebook). These criteria can be found in Appendices A.

In addition, other "spin-off" projects ensued. One of these, called the Texas Environmental Resource Stewards (TERS) was an informal workgroup of State and federal resource agency executives who committed to meet semi-annually to discuss current issues. The most pressing issues were related to the IH69 project and the potential for environmental impacts and also for opportunities for mitigation. In order to explore areas for collaboration and streamlining the executives tasked the technical staff from each agency to develop a map/tool from electronic data indicating locations that were "ecologically important." EPA Region 6 offered a tool that had been used successfully in Region 5 (i.e., CrEAM) for this purpose. The TERS executives agreed that the CrEAM fit Texas' needs and thus the application of CrEAM in Texas became known as the Texas Ecological Assessment Protocol (TEAP). The results of TEAP would be used as part of FHWA's analysis and incorporated as new criteria in the GISST.

Methods

The method described in the GISST User's Manual needed to be modified for the IH69 project. Roughly, GISST multiples area, vulnerability, and impact scores to obtain a cumulative score for the geographic area of interest. The method needed to be modified for IH69, since it would not be beneficial to get one "cumulative" number for the entire length of the corridor, nor would it be beneficial to have one score per SIU. What was needed were scores for defined geographical areas within each SIU. Therefore, the GISST methodology was modified to calculate scores for each 1km square within the corridor. Eventually, other areas outside of the corridor were included for analysis. In addition, the method was modified to exclude the area and impact portions of the equation and multipliers and to use a straight summation of the appropriate "vulnerability" criteria for each 1 km square. As explained above, the interdisciplinary technical team decided to use 20 criteria. The GISST user's manual lists about 100 criteria, however, using all of these criteria can lead to an information overload and wasted effort when certain criteria are not needed. The use of the grid also lent itself to a type of least-cost path analysis of potential road alignments. By using the 1km squares with lower scores (either the cumulative GISST score or the individual criteria), analysts could decide where the path of least environmental impact occurred. They could use that information along with traditional transportation engineering and safety factors to generate a potential reasonable corridor and then ultimately road alignment alternatives.

New criteria were added in order to address floodplains, wetlands, prime farmlands, etc. Eventually, when TEAP was complete, this information was used to generate new criteria that replaced other criteria, such as wildlife habitat.

Results and Discussion

Figures 9 show the results of the GISST for the proposed IH69 corridor. As the GISST developers stress, the cumulative score is an initial guide to help assessors evaluate the underlying individual criteria, and should not be used as a final decision. The cumulative and individual criteria scores should aid FHWA determine recommended reasonable corridor alternatives for the EIS.

In general, there are greater numbers of people (Figure 10) in the southern portion of IH69 (SIUs 14, 12, 7, 8, 9, 10) compared to the rest of the corridor with the exception of the Houston area (SIU 4). Environmental justice must also be considered in the NEPA process. Similar to population, a higher minority percentage occurs in the southern portion of the corridor (Figure 11). Economically-stressed communities occur throughout the length of the corridor (Figure 12).

Several land use types must also be addressed including prime farm lands (Figure13), public or managed lands (Figure 14), and locations of hazardous waste (Figure 15). The potential impacts to water are large issues to address in a project of this size, particularly the amount of streams (Figure 16), the number that are already impaired to some degree (Figure 17), and the number of wetland areas (Figure 18). Additionally, for safety and engineering problems, as well as environmental issues, floodplains are identified and locations prioritized (Figure 19). Potential impacts to air, in the form of distance to ozone nonattainment areas must be analyzed in the EIS (Figure 20).

After the initial GISST analysis was performed and FHWA continued their evaluation of data for the Tier I EIS, the TERS TEAP report became a final document. The interagency group conducted an internal peer review and each agency concurred on the final report. Since the TEAP represented better ecological information, Some of the initial GISST criteria were dropped because they were

Figure 9.

Figure 10.

Figure 11.

Figure 12.

Figure 13.

Figure 14.

Figure 15.

Figure 16.

Figure 17.

Figure 18.

Figure 19.

Figure 20.

incorporated into the TEAP or the TEAP had better information (e.g., species location data from Texas Parks and Wildlife Department). Therefore, the GISST was modified and performed again. The following criteria were replaced by TEAP results: wildlife habitat (Figure E1), Federally-listed species (Figure E2), state-listed species (FIgure E3), and ecologically significant streams (Figure E4). Figures 21-24 show the results of the TEAP criteria.

The cumulative result (Figure 25) shows that areas in southern Texas (SIUs 14, 13, 11) have fewer potential cumulative impacts compared to areas in the northern portion of IH69 (SIUs 3, 4, 5).

Once the GISST was performed, FHWA used it, along with other information, to delineate the proposed reasonable corridor ("b" in Figures 9-25). EPA was asked to review the proposed reasonable corridor and provide any comments. EPA used an overlay of the GISST analysis for the IH69 corridors, including additional areas outside of the Congressionally-determined corridor. EPA concluded that the proposed reasonable corridor had avoided or minimized impacts (where possible) to nearly all of the areas identified as highly vulnerable by GISST (Figure 25, deep red color). Further review the underlying criteria showed that the proposed reasonable corridor had also avoided or minimized potential impacts ("b" in Figures 9-25). Even though several criteria were replaced by TEAP information and not included in the final cumulative GISST score, they are provided in Appendix E for comparison (Figures E1-E4). In addition, Appendix E shows an individual SIU in east Texas (Figures E5-E25) so that the reader can view a close up of the GISST information, Congressional Corridor, and proposed reasonable corridor.

Figure 21.

Figure 22.

Figure 23.

Figure 24.

Figure 25.

Conclusions

The IH69 project is still a work-in-progress and has not reached its conclusion, but the GISST has provided a tool for environmental assessors and reviewers to aid in visualizing and prioritizing potential impacts so that alternatives can be developed that try to avoid or minimize impacts to these resources. EPA anticipates that the need for geospatial tools such as GISST will become greater given the more complicated time we live in. GISST has been a successful tool for transportation projects and EPA hopes to continue to use it and refine it. EPA and FHWA entered into a technology transfer agreement to develop a "GISST Toolbar" for ArcGIS 9 producst (ESRI). For those that use GIS as an analysis tool, the "GISST Toolbar" means that the GISST information for anywhere in Region 6 is only a few mouse clicks away and a few hours computation time. EPA has used the IH69 as an anecdotal validation process for GISST in that if GISST can identify/prioritize potential impacts and FHWA can avoid or minimize them, then perhaps environmental damage to sensitive or important resources will have been averted. This is the ultimate goal of NEPA and the environmental assessment process.

NEPA Document Preparation and Review

Location: Regionwide

Scale: Varies from small overpass replacement to multi-county pipeline corridor

Background: Typically, requests for information were answered with a form letter of sorts: a 10-12 page letter that reiterated CEQ regulations and traditional NEPA checklists of what to include in an EA or EIS. No project-specific information was included.

EPA Programs involved or impacted: NEPA

What was the environmental issue? Unknown, until GISST was performed. The results of the GISST showed 'red flags' for each issue. These were then communicated to the agencies requesting the information.

What was the ecological/environmental protection relationship? Multiple and depended on the project.

How did the tool aid in the resolution of the problem? The problem here is an administrative one–how does EPA provide information to those entities preparing NEPA documents early and specific enough that they can incorporate the information into their draft EA or EIS, or perform further investigations (e.g., field work or analysis of data)? The results of GISST point out areas of concern that should be further analyzed in the NEPA documents. This not only aids the preparer, but also EPA, in that the

reviewer can cross-check GISST with the information and analysis contained in the NEPA document and determine whether the concerns were adequately addressed.

What management decision was made? None, GISST results are for the EA/EIS preparers to incorporate into their draft documents. EPA may not see the final draft document for 1-2 years.

What GPRA goals were addressed? 9

What stakeholders were involved? Different Federal agencies and their contractors (if applicable).

What were the follow up steps or lessons learned? Due to limited resources, GISST is only performed as a courtesy to sister Federal agencies, not to contractors or private citizens. Thus, a Federal agency supervising a contractor to prepare assessments must contact EPA Region 6 and request information or GISST. Or if contacted by a contractor, a Federal contact must be provided. For the first few requests for information, EPA sent the GISST output in the form of a spreadsheet (Table A-3) and a letter indicating where the criteria could be found on the EPA website. For people not familiar with GISST or the output, this was not very user friendly. Therefore, a new letter was developed that summarized the issues that scored '4' or '5'–indicating a high concern to EPA (Figure B-12). Other information on how the GISST results might be used were also provided.

Table 3. Sample GISST output (2 mile buffers) for Aransas National Wildlife Refuge, Rancho, Blackjack and Lamar Units.

Criterion Name	Rancho		Blackjack		Lamar	
	Raw value	Score	Raw value	Score	Raw value	Score
Surface Water Use (% of streams meeting designated use)	0	3	0	3	0	3
Water Quality (STORET Exceedances per square mile)	0	1	0	1	0	1
Annual Average Rainfall (inches per year)	41.1	4	41	4	35.5	3
Unified Watershed Assessment (State Priorities)		3		3		3
Average surface water flow (cubic feet per second)	1315.7	2	0	5	43.2	4
Average aquifer geology score		4		4		4
Score for the Distance to surface water		3		1		3
Ozone nonattainment score by county		1		1		1
Sole Source Aquifer Score		1		1		1
Surface water quantity (stream/shoreline miles per sq mile)	1.715723	5	1.446415	4	1.112762	2
Percent of area that is surface water	32	4	33	4	32.7	4
Average Soil Permeability Score		1.4		3.4		3.5
Average Ground water probability score		1.6		3.0		3.2
Percent wildlife habitat	90.986191	5	92.562683	5	94.800003	5
Land Use/Land Cover average ranking	4.8	5	4.9	5	4.9	5

Criterion Name	Rancho		Blackjack		Lamar	
	Raw value	Score	Raw value	Score	Raw value	Score
Percent Agricultural Land	8.360503	1	7.338628	1	1.250755	1
Percent Wetland	43.846172	4	21.881397	2	21.212193	2
Percent within 100 year flood plain	77.910126	5	42.812851	4	70.91584	5
Percent within 500 year flood plain	85.366623	5	52.961918	5	83.556107	5
Road density (road mile per sq mile)	1.43507	2	1.006213	1	2.203287	4
Channelization (channel/canal miles per square mile)	0.302875	1	0.052736	1	0	1
Number of other sites around the facility	0	1	0	1	0	1
Percent of Population without a High School Degree	34.9282	2	29.2373	2	26.5625	1
Educational Achievement Score		2.3		2		1
Percent of households that are economically stressed	26.1905	1	34.3066	2	35.124	2
Percent of population that is considered a minority	12.3967	1	6.5359	1	5.8407	1
Percent of population that is under 7 years of age	1.2397	1	10.1307	1	7.4336	1
Percent of population that is over 55 years of age	52.0661	1	47.7124	1	52.5664	1
Percent of population that is under 1 year of age (natality)	1.2397	1	0.9804	1	0.708	1
Percent of population over 16 that is unemployed	5.9091	2	1.5873	1	1.0163	1
Population density (persons per square mile)	5.831836	1	1.506599	1	23.782158	1
Total Population	242		306		565	

Criterion Name	Rancho		Blackjack		Lamar	
	Raw value	Score	Raw value	Score	Raw value	Score
Percent of population does not speak English well/none	0	1	0.3584	1	0	1
Percent of households that are linguistically isolated	0	1	0	1	0	1
Percent of population that is foreign born	0	1	3.9216	1	3.8938	1
Score for Age of houses		1.9		1.6		1.4
Cumulative chemical releases to air from TRI	0			1		
Cumulative chemical releases to water from TRI	0			1		
Cumulative chemical releases to land from TRI	0			1		
Toxicity weighted releases to air	0			1		
Toxicity weighted releases to water	0			1		

Figure 26.

Figure 27. Sample letter explaining the GISST output.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TEXAS 75202-2733

RE: Comprehensive Conservation Plan/Environmental Assessment for the Aransas National Wildlife Refuge Complex

Dear:

The Environmental Protection Agency (EPA) has reviewed the information concerning the Comprehensive Conservation Plan/Environmental Assessment for the Aransas National Wildlife Refuge (NWR) Complex and included the results of our GIS Screening Tool (GISST). The output of this GIS tool is provided to assist the US Fish and Wildlife Service with the Environmental Assessment (EA) of the area. The GISST is a screening level assessment tool only and does not replace the need for field investigations, it merely points out what could exist in the project area.

The GISST uses GIS coverages and Hydrologic Unit Codes (HUC) for watersheds, then uses a decision structure to score criteria for a wide variety of concerns. The scores for each criterion range from 1, lowest environmental concern, to 5, highest potential concern or vulnerability. This scoring system is performed with a 2 mile buffer around each NWR unit area and at 4 miles around each NWR unit. These 2 buffers should give you a sense of direct effects (2 mile buffer) and indirect effects (4 mile buffer). Further details on the nature of the criteria can be found at www.epa.gov/ earth1r6/6en/xp/cria.pdf. In order to keep this letter to a manageable size, we have not included specific details of this tool (~30 page document), but we have enclosed a help sheet.

Additionally, EPA is concerned that two issues be adequately assessed in the EA: 1) cumulative effects and 2) environmental justice. Several EAs that EPA Region 6 has reviewed in the past have not adequately addressed these two concerns. Please feel free to contact us if you need assistance with these areas in the preparation of your NEPA documents.

Thank you for this opportunity to comment. If there are any questions please contact Dr. Sharon L. Osowski of my staff at osowski.sharon@epa.gov or (214) 665-7506.

GIS SCREENING TOOL (GISST) HELP SHEET

The enclosed GISST printout includes the following descriptions:

Column 1: Unique factor/criterion identifier.
Column 2-4: Criterion values/scores
Column 5: Criteria descriptions

Rows 1-8: Location information
Rows 9-21: ANWR subunits and subwatershed level criteria
Rows 22-43: Environmental vulnerability criteria for 4 miles around location project
Rows 44-68: Socio-economic criteria for 4 miles around project
Rows 69-78: Toxicity criteria for 4 miles around project
Rows 79-100: Environmental vulnerability criteria for 0.5 miles around location project
Rows 101-125: Socio-economic criteria for 0.5 miles around project
Rows 126-135: Toxicity criteria for 0.5 miles around project

Other information:

Many of the criterion identifiers are paired; 1) one identifier for the actual value as determined by GIS and 2) one identifier for the score that the value received under the GISST scoring system. For example, Row 9 shows the surface water use identifier (SURWTRUSE) and shows that 18.3% of streams are meeting their designated use within this particular subwatershed (based on the USGS HUC system). One interpretation of this is that the majority of streams (81.7%) in this subwatershed are not meeting their designated use under Clean Water Act Section 303d. The identifier SURWTRUSES (Row 10) shows the score or ranking of this surface water use value under GISST. In this example, surface water use scores the highest value, 5, indicating a high level of vulnerability and concern to EPA. Criteria are ranked using a 1 to 5 scale, with 1 representing low concern and 5 representing high concern. Scores of "4" or "5" are highlighted on the enclosed table and should be investigated further.

Socioeconomic criteria can be used as a starting point to assess environmental justice issues and to prepare communications strategies for scoping meetings or public meetings (e.g., number of children, high school education, English ability, etc.). Toxicity criteria can be used as a starting point to determine whether pollution sources may impact the proposed project site. Environmental criteria can be used as a starting point to determine and prioritize traditional "NEPA" issues.

The following scored "high" for the proposed site and should be further investigated:

- Rainfall. The Rancho and Blackjack Units receive more rainfall on average than the Lamar Unit. Rainfall is important in calculating potential runoff and other pollution events.
- Average surface/stream flow. The Blackjack Unit and Lamar Units may have low

surface water or stream flow. The less average stream flow the greater the concern for contaminant loading in a water body. This criteria is evaluated with data addressing the potential for pollutants being released to streams (see toxicity criteria).

- Aquifer geology score. Based on the geological formations, aquifers or groundwater are likely to be present for all three NWR units.
- Percent surface water (2 and 4 mile buffers). This criterion indicated that there is a high proportion of surface water in all three Units within 4 miles and within 2 miles of the Rancho and Blackjack Units.
- Percent Wildlife habitat (2 and 4 mile buffers). Using land cover GIS coverages, there is a high percentage of habitat that could potentially be used by wildlife (wetlands, rangelands, forest lands, woodlands, and/or bottomlands). This is to be expected for these locations.
- Land Use ranking (2 and 4 mile buffers). Each land use type in the GIS coverage is judged as to wildlife habitat quality. A score of "5" indicates wildlife habitat defined as rangeland, wetlands, forest lands, woodlands, herbaceous uplands, shrublands, open water. This is to be expected for these locations.
- Percent Wetlands (2 mile buffer). The Rancho Unit has a high percentage of wetland areas based on the GIS land cover coverage.
- Percent area within 100 year floodplain (2 and 4 mile buffer). All three Units are likely to reside in the 100 year floodplain (2 mi).
- Percent area within 500 year floodplain (2 and 4 mile buffer). This indicates that a high proportion of each ANWR unit occurs in the 500 year floodplain.
- Road density (2 mile buffer). (Lamar Unit only) High road density is often an indicator of habitat fragmentation, potential traffic congestion, or safety issues.
- Number of other sites near project area (4 mile buffer). These are other industries, pollution sources, or protected lands that could cumulatively affect the Blackjack Unit.

NOTE: GISST is a screening-level analysis only and is not a substitute for field investigations or ground verification of existing data.